

Description of a New Subspecies of the Genus *Saurogobio* Bleeker (1870)

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Abstract: The genus *Saurogobio* Bleeker (1870) is a group of small-sized cyprinids. *Saurogobio dabryi* Bleeker (1871) is widely distributed in East Asia. On the basis of careful inspection of morphological and meristic characters of specimen collected from Chenghai Lake in Yunnan and the opening river systems including Pearl River, Minjiang River, Yangtze River, Liaohe River and Songhuajiang River, the Chenghai Lake population of *Saurogobio dabryi* is considered to represent a new subspecies, *Saurogobio dabryi chenghaiensis*.

Saurogobio dabryi chenghaiensis is distinguished by the combination of following characters. Rostral cap developed, covering over upper lip, and lips with developed papillae. Body and caudal peduncle very slender, body depth 12.7% - 15.0% of standard length (SL), caudal peduncle depth 5.5% - 6.1% of SL and 31.8% - 39.1% of caudal peduncle length. A longitudinal dark stripe present along the axis on each side of body and 6 - 11 stick-shaped black spots (its widths being 25% - 50% of its lengths respectively) occur along the stripe. Distance from pelvic fin origin to anus is more than 50% of pelvic fin length. The length of the shortest caudal fin ray is less than 50% that of the longest one. The new subspecies occurs only in Chenghai Lake, Yunnan, China.

Key words: *Saurogobio*; New subspecies; Coefficient of difference; Key

蛇鲇属一新亚种记述

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摘要: 蛇鲇属为一群小型鲤科鱼类。蛇鲇广泛分布于东亚大陆。通过对采自云南程海和珠江、闽江、长江、辽河、松花江等水系蛇鲇标本的形态、度量特征进行仔细分析和比较, 认为蛇鲇程海种群是蛇鲇的 1 个新亚种, 命名为程海蛇鲇 (*Saurogobio dabryi chenghaiensis*)。

程海蛇鲇的特征为: 吻皮发达, 盖过上唇; 上下唇布满发达的乳突; 体及尾柄极细长, 体高为体长的 12.7% ~ 15.0%, 尾柄高为体长的 5.5% ~ 6.1%、为尾柄长的 31.8% ~ 39.1%; 沿体侧中轴自鳃孔上方至尾鳍基具一浅色暗纹, 其上布有 6 ~ 11 个大型棒状黑斑 (黑斑长为宽的 2 ~ 4 倍); 肛门位于腹鳍长度的中点之后; 尾鳍最长鳍条为其最短鳍条的 2 倍以上; 仅分布于云南程海。

关键词: 蛇鲇属; 新亚种; 差异系数; 检索表

中图分类号: Q959.468 文献标识码: A 文章编号: 0254 - 5853(2002)04 - 0306 - 05

1 Introduction

The genus *Saurogobio* Bleeker (1870) is a group of small-sized cyprinids characterized by elongate

body, lacrimal bone extending forward to near the tip of the snout, inferior mouth, lips with papillae (except for *S. gymnocheilus*), dorsal-fin origin much nearer to the tip of snout than to caudal fin base, anterior cham-

Received date: 2002 - 02 - 22; Accepted date: 2002 - 05 - 22

Foundation item: This work was supported by the National Natural Science Foundation of China (30070095) and the Natural Science Foundation of Yunnan Province

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ber of air-bladder enclosed in a bony capsule. So far, six valid species (*Saurogobio dabryi*, *S. dumerili*, *S. gracilicaudatus*, *S. gymnocheilus*, *S. immaculatus* and *S. xiangjiangensis*) have been reported from East Asia including China, Russia, Korean peninsula and northern Vietnam.

Saurogobio dabryi Bleeker (1871) is widely distributed in East Asia. Because of variations among geographical populations, four nominal species were described after Bleeker (1871): *Gobiosoma amurensis* Dybowski (1872), *Pseudogobio productus* Peters (1880), *Pseudogobio drakei* Abbott (1901), and *Saurogobio longirostris* Wu et Wang (1931), and later demonstrated to be synonyms of *Saurogobio dabryi* (Luo et al., 1977; Yue, 1998). On the basis of careful inspection of morphological and meristic characters of specimen of *Saurogobio dabryi* collected from Chenghai Lake in Yunnan and the opening river systems including Pearl River, Minjiang River, Yangtze River, Liaohe River, and Songhuajiang River, the Chenghai Lake population of *Saurogobio dabryi* is considered to represent a new subspecies of *Saurogobio dabryi* in this paper.

2 Materials and Methods

Counts and measurements follow Chu & Chen (1989). Specimens examined are all adults including males and females, which belong to Kunming Institute

of Zoology (KIZ), the Chinese Academy of Sciences. Abbreviations used in this paper are: SL, standard length; LL, lateral line scales; Pa, distance from pelvic fin origin to anus; PA, distance between pelvic and anal fin origins; PP, distance between pectoral and pelvic fin origins; CR, caudal fin ray; Head width, width of head at the posterior margin of head.

The coefficients of difference are calculated and used here as the index for determining the differentiation rank between the Chenghai Lake population of *Saurogobio dabryi* and those specimen collected from Pearl River, Minjiang River, Yangtze River, Liaohe River, and Songhuajiang River. 1.28 of coefficient of difference of characters indicates 90% sample difference between the populations, which means that the differentiation reaches the subspecies level when complete geographical barriers are present between the populations (Mayr, 1965).

The skeletal specimens were cleared and stained following modifications of the methods proposed by Dingerkus & Uhler (1977) and Taylor & Dyke (1985) and then inspected in this research.

3 Results

3.1 *Saurogobio dabryi chenghaiensis* Dai et Yang, subsp. nov. (Fig. 1)

Saurogobio dabryi: Luo et al., 1977: 539 (Chenghai); Chen et al., 1983: 227 (Chenghai); Chen

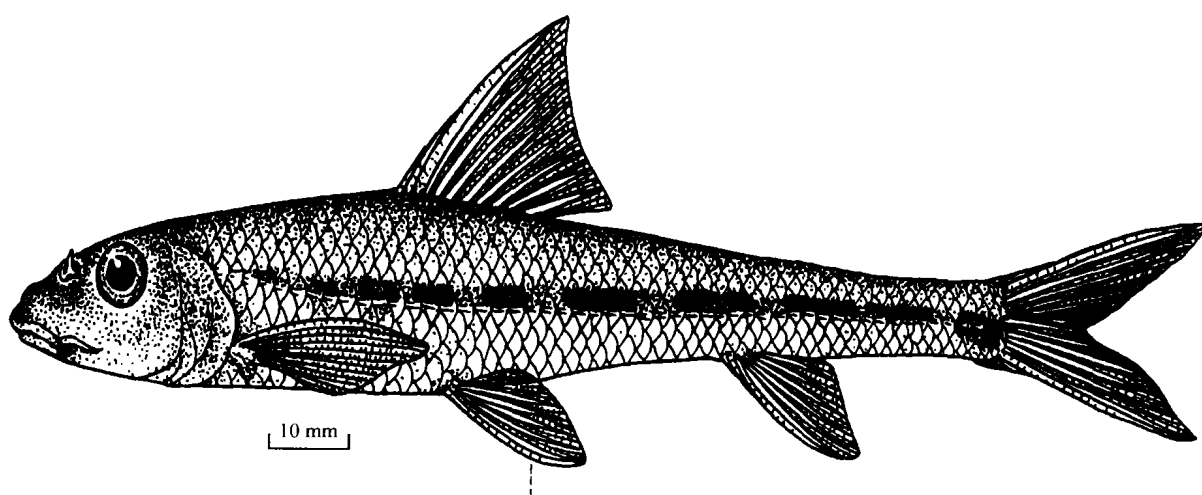


Fig. 1 Left lateral of *Saurogobio dabryi chenghaiensis* subsp. nov., holotype, KIZ 797278, 123.5 mm SL, Chenghai Lake, Yunnan, China

& Li, 1989: 116 (Chenghai); Yue, 1998: 381 (Chenghai).

Holotype: KIZ797278, 123.5 mm SL, collected in 1979 from Chenghai Lake (i.e. $100^{\circ}38' - 100^{\circ}49' E$, $26^{\circ}27' - 26^{\circ}38' N$), Yunnan, China.

Paratypes: KIZ797266, 797267, 797269, 797270, 797271, 797272, 797273, 797274, 797276, 797277, 797279, 11 specimens examined, 109 – 139 mm SL, same data as holotype.

Diagnosis: The new subspecies is distinguished from its congener by the following characters (Table 1). Rostral cap developed, covering upper lip, and

lips with developed papillae (Fig.2). Body and caudal peduncle are very slender, body depth 12.7% – 15.0% of SL, caudal peduncle depth 5.5% – 6.1% of SL and 31.8% – 39.1% of caudal peduncle length. A longitudinal dark stripe is present along the axis on each side of body and 6 – 11 stick-shaped black spots (its widths being 25% – 50% of its lengths respectively) occur along the stripe. Distance from pelvic fin origin to anus is more than 50% of pelvic fin length. The caudal fin deeply forked, and the length of the shortest caudal fin ray is less than 50% that of the longest one.

Table 1 Comparison of morphometric and meristic characters of *Saurogobio dabryi dabryi* and *S. d. chenghaiensis* subsp. nov.

	<i>Saurogobio dabryi dabryi</i> ¹	<i>S. d. chenghaiensis</i>	Coefficient of difference
	Range Mean \pm SD	Range Mean \pm SD	
Number of soaked specimen	50	12	
Number of skeletal specimen	6	6	
Number of vertebra	45 – 47	47 – 49	
Number of trunk vertebra	17 – 19	19 – 21	
Number of vertebra before the insertion of the 1st pterygiophore of dorsal fin	8 – 10	10 – 11	
Circumpeduncle scales	12	10 – 12	
Body depth/SL (%)	14.0 – 21.1 16.4 \pm 0.019	12.7 – 15.0 13.7 \pm 0.008	1.00
Caudal peduncle depth/SL (%)	6.3 – 7.7 6.9 \pm 0.003	5.5 – 6.1 5.8 \pm 0.002	2.20
Caudal peduncle depth/caudal peduncle length (%)	41.2 – 53.8 46.0 \pm 0.027	31.8 – 39.1 35.8 \pm 0.024	2.00
Pelvic fin length/distance from pelvic fin origin to anus (%)	< 50	> 50	
The shortest CR length/the longest CR length (%)	> 50	< 50	
Rostral cap	undeveloped, not covering upper lip	developed, covering upper lip	
Number of spot on each side of body	9 – 15	6 – 11	
Shape of spot on sides of body	square or circular	stick-shaped	
Anterior margin of frontals	a deep notch present	notch absent	
Shape of the 2nd infraorbital	rectangle-shaped	fan-shaped	

¹ The specimen of *Saurogobio dabryi dabryi* were collected from Pearl River, Minjiang River, Yangtze River, Liaohe River and Songhuajiang River.

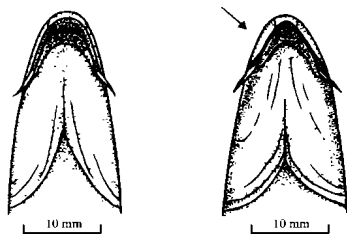


Fig.2 Heads in ventral view of *Saurogobio dabryi dabryi* (left) and *S. d. chenghaiensis* subsp. nov. (right)

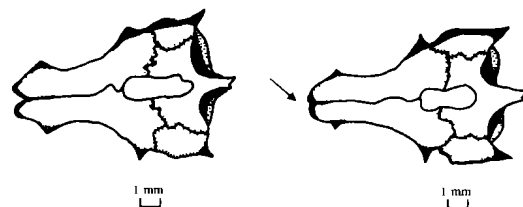


Fig.3 Neurocrania in dorsal view of *Saurogobio dabryi dabryi* (left) and *S. d. chenghaiensis* subsp. nov. (right)

No notch is present at the anterior margin of frontals (Fig.3). The 2nd infraorbital is fan-shaped (Fig.4).

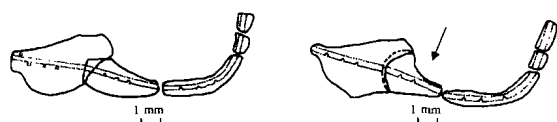


Fig.4 Left infraorbital series of *Saurogobio dabryi dabryi* (left) and *S. d. chenghaiensis* subsp. nov. (right)

Description: D iii, 8; A iii, 6; P i, 13–15; V i, 7; lateral line scales 47–51, scale rows above LL 5–6, scale rows below LL 3; circumpeduncle scales 10–12; total vertebra 47–49. Morphometric and meristic characters are shown in Table 2.

Body slender and cylindrical. Head conical and elongated. Snout length approximately equal to or less than postorbital length of head. Tip of snout pointed. Mouth inferior and deeply arc-liked. Rostral cap deve-

Table 2 Morphometric and meristic characters of *Saurogobio dabryi chenghaiensis* subsp. nov.

	Holotype	Paratypes			Holotype	Paratypes	
		Range	Mean \pm SD			Range	Mean \pm SD
Number of specimen	1	11					
SL (mm)	123.5	109–139		In percentage of head length			
		124.6 \pm 8.52		Snout length	38.5	35.7–41.8	
Dorsal fin rays	iii, 8	iii, 8				38.8 \pm 0.02	
Anal fin rays	iii, 6	iii, 6		Eye diameter	25.0	23.1–28.0	
Pectoral fin rays	i, 14	i, 13–15				25.8 \pm 0.01	
Pelvic fin rays	i, 7	i, 7		Interorbital width	27.0	24.0–28.2	
Scale rows above LL	6	5–6				25.4 \pm 0.01	
LL	51	47–51		In percentage of head depth			
Scale rows below LL	3	3		Head width	96.8	87.5–100	
Predorsal scales	11	9–12				95.4 \pm 0.04	
Circumpeduncle scales	12	10–12		In percentage of caudal peduncle length			
Gill rakers	12	10–12		Caudal peduncle depth	31.8	33.3–39.1	
Fontanelle	1	1				36.2 \pm 0.02	
In percentage of SL				In percentage of PP			
Body depth	13.8	12.7–15.0		Pectoral fin length	76.6	70.7–80.3	
		13.7 \pm 0.01				76.7 \pm 0.03	
Head length	21.1	20.5–22.7		In percentage of PA			
		21.3 \pm 0.01		Pa	35.1	26.7–35.9	
Caudal peduncle length	17.8	15.0–17.3				30.3 \pm 0.02	
		16.0 \pm 0.01		Pelvic fin length	51.4	44.9–60.9	
Caudal peduncle depth	5.7	5.5–6.1				50.9 \pm 0.04	
		5.8 \pm 0		Number and shape of spot on each	10	6–11	
Predorsal length	37.2	35.0–40.0		side of body	sticked-shaped	sticked-shaped	
		38.1 \pm 0.02		Maxillary barbel reaching back to	anterior 1/3 of eye	anterior 1/3 of eye	

loped, covering upper lip, and lips with developed papillae. One pair of maxillary barbels, extending back to the anterior 1/3 of eye. The interorbital is flat, approximately equal to eye diameter. Lacrimal bone extends forward near to the tip of snout. The 2nd infraorbital is fan-shaped. The 3rd infraorbital is very slender. Head with one fontanelle (Fig.3). Gill rakers 10–12, short and small. Anterior chamber of air-bladder enclosed in a bony capsule. Lateral line is complete and straight. Body covered with small cycloid scales except for the thorax area.

Origin of dorsal fin much nearer to tip of snout

than to caudal fin base. The last unbranched dorsal fin ray soft. Tip of pectoral fin not extending back to pelvic fin origin. Pelvic fin origin is opposite to the middle of dorsal fin base, nearer to pectoral fin origin than to anal fin origin. Tip of pelvic fin extending back over anus. Distance from pelvic fin origin to anus more than 50% of pelvic fin length. Anal fin origin nearer to caudal fin base than to pelvic fin origin. Caudal fin deeply forked. The length of the shortest caudal fin ray is less than 50% that of the longest one.

Color in formalin: Dorsal and sides of body are slightly yellowish, abdomen silvery. A longitudinal

dark stripe and 6 – 11 stick-shaped black spots are present along the axis on each side of body, and the widths of spots are 25% – 50% of their lengths respectively.

Etymology: Chenghai, a freshwater lake in north-western Yunnan, China; alluding to the type locality of the new subspecies.

Distribution: So far, the new subspecies has been found only in Chenghai Lake, Yunnan, China.

Ecology: *Saurogobio dabryi chenghaiensis* lives near the bottom in Chenghai Lake. It is omnivorous and feeds on crustacea, larva of zaitha, algae and remnants of dead plants (Chen & Li, 1989).

3.2 Key to species of *Saurogobio*

- 1a. No black spot on sides of body 2
- 1b. 6 – 15 black spots on each side of body 4
- 2a. No longitudinal dark stripe present along the axis on each side of body, lateral line scales about 60, thorax scaled *S. dumerili* Bleeker
- 2b. A longitudinal dark stripe present along the axis on each side of body, lateral line scales 40 – 46, thorax devoid of scales 3
- 3a. Lateral line scales about 40, gill rakers about 20 *S. immaculatus* Koller

- 3b. Lateral line scales about 45, gill rakers about 10 *S. gracilicaudatus* Yao et Yang
- 4a. Lips thin, without papillae *S. gymnocheilus* Lo, Yao et Chen
- 4b. Lips thick, with papillae 5
- 5a. No longitudinal dark stripe present along the axis on each side of body, lateral line scales 52 – 54 *S. xiangjiangensis* Tang
- 5b. A longitudinal dark stripe present along the axis on each side of body, lateral line scales 45 – 51 6
- 6a. Rostral cap undeveloped, not covering upper lip; 9 – 15 square or circular black spots on each side of body; distance from pelvic fin origin to anus is less than 50% of pelvic fin length *S. dabryi dabryi* Bleeker
- 6b. Rostral cap developed, covering upper lip; 6 – 11 stick-shaped black spots on each side of body; distance from pelvic fin origin to anus is more than 50% of pelvic fin length *S. dabryi chenghaiensis* Dai et Yang

Acknowledgements: We wish to express our thanks to CHEN Yin-rui, KUANG Pu-ren, LI Zai-yun, CHEN Zi-ming, CHEN Xiao-yong and Associate CUI Gui-hua for their help. We also thank WU Bao-lu for preparing the illustration of holotype.

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